

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) IMPROVEMENTS IN DOUBLE-WALLED METAL FLUE PIPES

(71) I, ALAN HENRY TOWERS, of Green Rigg, Sandy Bank, Riding Mill, Northumberland, formerly of "Glenholme," Sterlings Lane, Rowlands Gill, County Durham; a British Subject do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

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10 The present invention concerns improvements in double-walled metal flue pipes, and more specifically concerns the provision of an improved expansion joint between adjacent flue pipe sections.

15 It is known for double-walled metal flue pipes to be formed from a plurality of prefabricated pipe sections, the sections each having a male and female and for connecting together successive pipe sections in end to end relationship. The joint formed between each adjacent pair of pipe sections must be gas-tight, or substantially so, and provision must also be made for greater expansion and contraction of the inner wall relative to the outer wall due to the much higher operating temperatures encountered by the inner wall.

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20 In a known coupling between two adjacent pipe sections the female element consists of radially inwardly and outwardly extending peripheral bends in the inner and outer walls respectively, the bends being spaced from the ends of the walls and having their apices secured together, whilst the male element inserted between the thus radially spaced inner and outer wall portions forming the female element has the end portion of the outer wall bent through 180° to overlap the end of the inner wall, thereby allowing expansion and contraction of the inner walls to be accommodated within the male elements. In this arrangement adjacent pipe sections are secured together by screws extending through aligned slots in the outer walls of the male and female elements.

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25 Such pipe sections are generally complex and hence expensive to produce, and it is therefore an object of the present invention to provide such double-walled metal flue pipe sections which may be connected together by gas-tight expansion joints which are of less complex construction whilst having improved sealing efficiency.

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35 According to the present invention a double-walled metal pipe section for connection in end to end relationship with one or more similar pipe sections to form a flue pipe of any desired length, comprises substantially concentric inner and outer walls, the walls being connected together at one end thereof to form a male element whilst the other ends of the walls are open to form an annular female element adapted to receive the male element of a like pipe section, said outer wall having a pair of circumferential grooves which simultaneously define the extent of the male and female elements and maintain the concentricity of the inner and outer walls.

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45 The invention will now be described further, by way of example, with reference to the accompanying drawing, in which the single figure is a part sectional elevation of a double-walled metal pipe section constructed in accordance with the invention.

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55 The pipe section shown in the drawing comprises substantially concentric inner and outer walls 11 and 12 respectively, the walls being connected together at one end thereof to form a male element 13 whilst the other ends of the walls are open to form an annular female element 14 adapted to receive the male element 13 of a like pipe section. The outer wall 12 is provided with a pair of circumferential grooves 13a and 14a which respectively define the extent of the male and female elements 13 and 14 and simultaneously maintain the concentricity of the inner and outer walls 11 and 12.

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65 Preferably the male element 13 of the pipe section includes an inner wall portion 11a of

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[Price]

somewhat larger diameter than that of the remaining inner wall portion 11, and the female element 14 of the pipe section has an outer wall portion 12a of somewhat larger diameter than that of the remaining outer wall portion 12, thereby permitting mating of the male element 13 with the female element 14 of a like pipe section, with the inner wall portion 11a of the male element 13 forming an abutment surface accommodating free expansion and contraction of the inner wall of an adjacent pipe section.

In such an arrangement, adjacent pipe sections are connected together with the inner wall portion of the female element disposed internally of and abutting the inner wall portion 11a of the male element, thereby forming a flue pipe having an inner wall 11 which is free of protruberances and which thus allows an unimpeded flow of combustion products.

In order to facilitate assembly of a male element 13 within the female element 14 of a like pipe section, the inner wall portion of the male element may include an intermediate surface 11b of larger diameter than that of the wall portion 11a forming the abutment surface, with an inclined guide surface 11c extending therebetween. Thus, to assemble adjacent pipe sections the male element is introduced into the annular female element until the inner wall of the female element is aligned with the intermediate surface 11b of the male element, after which the male element may be readily pushed fully home with the guide surface 11c engaging the inner wall of the female element and guiding it onto the abutment surface 11a, thereby bringing the pipe sections into accurate axial alignment. The extent of insertion of the male element is limited by the circumferential groove 14a in the outer wall 12 which defines the extent of the female element.

Connection of the inner and outer walls of the male end of each section may be achieved in any suitable manner. In the arrangement shown in the drawing, however, the end regions of the walls 11 and 12 are brought together with the outer wall 12 extending beyond the inner wall 11, the end regions of the walls 50 then being folded radially inwardly sufficiently to lock the walls together. In such an arrangement a further inclined wall portion 11d extends between the intermediate surface 11b and the folded end region of the inner wall 55 portion of the male element.

Adjacent pipe sections are maintained in their assembled condition by means of a locking band 15 extending circumferentially about the joint, the locking band 15 comprising a generally cylindrical central portion 15a and radially inwardly extending circumferential grooves 15b at the edges having a profile corresponding to that of the circumferential grooves 13a, 14a in the outer wall. The cir-

cumferential groove 15b at the edges of the locking band are thus engagable one in each of the grooves 13a, 14a defining the extent of the male and female elements of adjacently assembled pipe sections. The locking band may be secured by a toggle clip (not shown) or other suitable means.

The annular space between the inner and outer walls of each pipe section may contain air or may be filled with a mineral or fibre thermal insulation material.

WHAT I CLAIM IS:—

1. A double-walled metal pipe section for connection in end to end relationship with one or more similar pipe sections to form a flue pipe of any desired length, comprising substantially concentric inner and outer walls, the walls being connected together at one end thereof to form a male element whilst the other ends of the walls are open to form an annular female element adapted to receive the male element of a like pipe section, said outer wall having a pair of circumferential grooves which simultaneously define the extent of the male and female elements and maintain the concentricity of the inner and outer walls.

2. A pipe section as claimed in claim 1, in which the male element of the pipe section includes an inner wall portion of somewhat larger diameter than that of the remaining inner wall portion; and the female element of the pipe section has an outer wall portion of somewhat larger diameter than that of the remaining outer wall portion, such as to permit mating of the male element with the female element of a like portion section with the inner wall portion of the male element forming an abutment surface accommodating free expansion and contraction of the inner wall of the adjacent pipe section.

3. A pipe section as claimed in claim 2, in which the inner wall portion of the male element includes an intermediate surface of larger diameter than that of the wall portion forming the abutment surface, and an inclined guide surface extending therebetween.

4. A pipe section as claimed in any preceding claim, in which the cavity formed between the inner and outer walls is packed with a mineral or fibre thermal insulation material.

5. A flue pipe formed by two or more pipe sections as claimed in claim 1, 2 or 3, wherein adjacent pipe sections are maintained in their assembled condition by means of a locking band extending circumferentially about the joint, said locking band comprising a generally cylindrical central portion and radially inwardly extending circumferential grooves at the edges thereof, the grooves having a profile corresponding to that of the circumferential grooves in the outer walls of the pipe sections.

6. A double-walled metal pipe section for connection in end to end relationship with one or more similar pipe sections to form a flue

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pipe of any desired length, constructed and arranged substantially as herein described with reference to and as illustrated in the accompanying drawing.

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COMPLETE SPECIFICATION

*This drawing is a reproduction of  
the Original on a reduced scale*

